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**PROTECTIVE LUBRICANT FORMULATION**

CROSS REFERENCES TO RELATED APPLICATIONS: Submission to enter the National Stage under 35 U.S.C. 371, International application no.

PCT/US2004/009757, with International filing date of March 31, 2004, and priority date claimed of March 31, 2003, with title "Protective Lubricant Formulation."

Statement as to rights to inventions made under federally sponsored research and development: Not applicable.

**BACKGROUND OF THE INVENTION****1. Field of the Invention.**

The present invention relates generally to protective lubricating compositions. More particularly, it relates to a corrosive inhibitor for protecting surfaces by applying a protective lubricant formulation comprising one hundred percent (100%) hydrocarbon components.

**2. Brief Description of Prior Art.**

A plurality of surface protective compositions are known in the art and available. Typically, these lubricants are applied to various surfaces through spraying, brushing or dipping and the lubricant then spreads or flows on the surface area. Such lubricants are applied to surfaces subject to the influence of corrosion. These coatings generally adhere to the permanent finish or metal surfaces which surfaces, when exposed to elements such as fresh or salt water, snow and the like, are susceptible to rapid corrosion. Presently such coating compositions may consist of a hydrocarbon component, but generally include various additives such as, water, esters, amides, glycols, phosphates, which forms the actual protective coatings.

Consequently, there exists a need for a surface protectant composition that can be applied to a variety of surfaces yet easy to apply, is self-leveling over the surface and provides anti-corrosive capabilities. Applicants have discovered a new formulation comprising of one hundred percent (100%) hydrocarbon components that is useful as an anti-corrosive lubricant.

As will be seen from the subsequent description, the preferred embodiments of the present invention overcome shortcomings of the prior art.

## SUMMARY OF THE INVENTION

Briefly stated, the present invention is directed to a quick-leveling liquid surface protectant composition together with a method of imparting a protective coating. The formulation is composed of one hundred percent (100%) hydrocarbon components. In particular, the composition consists of a synthetic iapparaffinic hydrocarbon (mineral spirits), and first and second petroleum hydrocarbons.

The protectant formulation can be applied to the surfaces of, for example, marine equipment, automotive, battery terminals, hand tools, farm equipment, recreational vehicles, heavy equipment, motorcycles, bicycles, shop machinery, power tools, household appliances, roller bearings, actuating cables, and hinges. The protective lubricant formulation of the present invention is easy to apply, is self-leveling over the surface, and provides anti-corrosive capabilities.

The formulation includes from about 20 to about 75 percent by weight of a synthetic iapparaffinic hydrocarbon; from about 1 to about 30 percent by weight of a first petroleum hydrocarbon; and, from about 1 to about 40 percent by weight of a second petroleum hydrocarbon. Said first petroleum hydrocarbon manufactured by ExxonMobil Corporation under the trade name PROWAX 561, and said second petroleum hydrocarbon manufactured by ExxonMobil Corporation under the trade name PROWAX 891. It is noted that, unless otherwise stated, all percentages given in this specification and the appended claims refer to percentages by weight of total

formulation.

The present formulation can be easily and evenly applied. Because this invention is particularly useful as a protective coating on a variety of surfaces, it will be described herein by reference to surfaces. Such description, however, is not intended to limit the scope of the invention.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be illustrated on the basis of the following description of the preferred embodiments thereof.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

In accordance with the present invention, a protective lubricant formulation is disclosed. More particularly, the formulation of the present invention is a surface protectant formulation that can be applied to a variety of surfaces yet easy to apply, is self-leveling over the surface and provides anti-corrosive capabilities.

Specifically, it will be noted in the following description that the present disclosure relates to an improved protective lubricant formulation having anti-corrosive properties. In the broadest context, the formulation consists of components configured with respect to each other so as to attain the desired objective.

In the preferred embodiment of the present invention, a protective lubricant formulation with enhanced anti-corrosion capabilities is provided comprising of one hundred percent (100%) hydrocarbon components. In particular, the composition includes a solvent hydrocarbon, and first and second petroleum hydrocarbons.

The hydrocarbon solvent, which is mineral spirits, constitutes a major amount of the protective lubricant formulation and is in the range of from about 20% to about 70% by weight of the total composition. Most preferably, the hydrocarbon solvent is

present in the range of from about 50% to about 60% by weight of the total composition, with about 55% being optimal. The term "mineral spirits" as it is used herein is preferably the chemical named synthetic iapparaffinic hydrocarbon having solvent-like properties to harmonize the action of the other ingredients contained in the lubricant formulation of the present invention as described hereinafter.

The first and second petroleum hydrocarbons are paraffin waxes and together constitute the balance of the protective lubricant formula. Paraffin waxes contain predominantly straight chain hydrocarbons with an average chain length of 20 – 30 carbon atoms. Paraffin waxes commonly contain a smaller portion of branched iso-paraffin hydrocarbons. The first and second paraffin waxes can be slack or scale waxes such as those commonly derived through petroleum distillation. In particular, the first petroleum hydrocarbon is in the range of from about 1% to about 35% by weight of the total formulation. Most preferably, the first petroleum hydrocarbon is present in the range of from about 13% to about 23% by weight of the total formulation, with about 18% being optimal.

The physical properties of the first hydrocarbon can be can be generally defined as:

Paraffin wax

SOLUBILITY IN WATER: Negligible

VISCOSITY AT 40 C, cSt: >70.0

VISCOSITY AT 100 C, cSt: > 6.8

Oil content: 20%

Congearing point in the range of 55 – 70 °C.

The first petroleum hydrocarbon has a lower viscosity than the second hydrocarbon, this gives the total formulation greater penetration so that the total formulation is better able to penetrate through rust, dirt and seams and provides greater protection against oxidation than would be possible with the second hydrocarbon alone. As such, the formulation can be used to prevent metallic oxidation or to penetrate and allow rusted parts, such as bolts, to be loosened.

In accordance with the preferred embodiment, the first petroleum hydrocarbon can be a paraffin such as PROWAX 561 manufactured by ExxonMobil Corporation.

The second petroleum hydrocarbon is in the range of from about 1% to about 40% by weight of the total formulation. Most preferably, the second petroleum hydrocarbon is present in the range of from about 21% to about 31% by weight of the total formulation, with about 26% being optimal.

The physical properties of the second petroleum hydrocarbon can be generally defined as:

Paraffin wax

SOLUBILITY IN WATER: Negligible

VISCOSITY AT 40 C, cSt: > Not Applicable

VISCOSITY AT 100 C, cSt: > 16.0

Congealing point in the range of 40 - 55 °C.

The second petroleum hydrocarbon has a higher viscosity than the first hydrocarbon, this gives the total formulation greater body so that the total formulation has a longer useful life and provides greater protection than would be possible with the first hydrocarbon alone. As such the formulation, when placed on a surface, forms a seal that protects against moisture, rust and corrosion. The formulation includes paraffins that are not significantly water soluble and thus the formulation will not easily wash off with water. The formulation can however be removed with organic solvents. Because it contains heavy bodied paraffins, the formulation can be sprayed on surfaces such as chains, gears and mechanisms and the formulation will not drip off like oil. The formulation instead forms a gel-like mass a portion of which will stay put on a surface even after some of the lighter components of the formulation have penetrated the surface.

In accordance with the preferred embodiment, the second petroleum hydrocarbon can be a paraffin such as PROWAX 890 manufactured by ExxonMobil Corporation.

The formulation can be prepared by thoroughly mixing with slight agitation each of the components. Preferably, the formulation is prepared by the following steps: charge the desired amount of the solvent hydrocarbon to a mix vessel, add the first petroleum hydrocarbon to the mix vessel with slight agitation, then add the second petroleum hydrocarbon to the mix vessel with slight agitation and continue to agitate at ambient temperature until all the ingredients are thoroughly mixed. In the more preferred embodiment, the formulation is mixed using about 55% mineral spirits, about 18% of the first petroleum hydrocarbon, and about 26% of the second petroleum hydrocarbon. In this embodiment, the formulation can be applied to the surface to be protected by the use of an aerosol, preferably a non-polar aerosol, or by a pump spray. Of course, other means of applying the formulation are contemplated, such as by wetting a sponge, brush, cloth or the like, with the formulation and then applying the sponge, brush or cloth directly to the surface to be protected, or when applicable, by submerging the object to be protected directly into the formulation. When not applying the formulation with a spray or aerosol as discussed above, the ratio of the formulation may be varied consistent with the acceptable range disclosed herein.

Although the description above contains many specificities, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments of this invention. It is understood the components of the protective lubricant described and characterized here are not exclusive of other equivalent components which are within the scope of the appended claims. It should be understood by one skilled in possession of this disclosure having studied the same that he can determine by mere routine tests components equivalent to the solvent hydrocarbon component and the first and second petroleum hydrocarbon components of the invention for admixture therewith.

Thus the scope of the invention should be determined by the appended claims in the formal application and their legal equivalents, rather than by the examples given.

## Claims

I claim:

1. A surface protective lubricant formulation having anti-corrosive capabilities, said lubricant formulation comprising:
  - a solvent hydrocarbon, and
  - a first petroleum hydrocarbon, and
  - a second petroleum hydrocarbon,wherein the hydrocarbon solvent is in the range of from about 20% to about 70% by weight of the total formulation,
  - wherein the first petroleum hydrocarbon is a paraffin having a viscosity at 100 °C greater than 6 centistokes and is in the range of from about 1% to about 35% by weight of total formulation, and
  - wherein the second petroleum hydrocarbon is a paraffin having a viscosity at about 100 °C greater than 16 centistokes and is in the range of from about 1% to about 40% by weight of the total formulation.
2. The protective lubricant formulation as recited in Claim 1, wherein the hydrocarbon solvent is about 55% by weight of the total formulation.
3. The protective lubricant formulation as recited in Claim 2, wherein the first petroleum hydrocarbon is a about 18% by weight of the total formulation.
4. The protective lubricant formulation as recited in Claim 3, wherein the second petroleum hydrocarbon is about 26% by weight of the total formulation.
5. The protective lubricant formulation as recited in Claim 1, wherein the first petroleum hydrocarbon is manufactured by ExxonMobil Corporation under the trade name PROWAX 561.

6. The protective lubricant formulation as recited in Claim 1, wherein the second petroleum hydrocarbon is manufactured by ExxonMobil Corporation under the trade name PROWAX 890.

7. A method of preparing a surface protective lubricant formulation having anti-corrosive capabilities comprising:

- adding a solvent hydrocarbon to a mix vessel,
- adding a first petroleum hydrocarbon to the mix vessel with slight agitation,
- adding a second petroleum hydrocarbon to the mix vessel with slight agitation,
- agitating until all the ingredients are thoroughly mixed,
- wherein the hydrocarbon solvent is in the range of from about 20% to about 70% by weight of the total formulation,
- wherein the first petroleum hydrocarbon is in the range of from about 1% to about 35% by weight of the total formulation,
- wherein the second petroleum hydrocarbon is in the range of from about 1% to about 40% by weight of the total formulation,
- wherein the first petroleum hydrocarbon is manufactured by ExxonMobil Corporation under the trade name PROWAX 561, and
- wherein the second petroleum hydrocarbon is manufactured by ExxonMobil Corporation under the trade name PROWAX 890.

8. The method as recited in Claim 7, wherein the hydrocarbon solvent is about 55% by weight of the total formulation.

9. The method as recited in Claim 8, wherein the first petroleum hydrocarbon is about 18% by weight of the total formulation.

10. The method as recited in Claim 9, wherein the second petroleum hydrocarbon is about 26% by weight of the total formulation.



11. A protective lubricant formulation having anti-corrosive capabilities, said lubricant formulation comprising;
- a mineral spirits solvent, and
  - a first petroleum hydrocarbon, and
  - a second petroleum hydrocarbon,
- wherein the mineral spirits solvent is in the range of from about 20% to about 70% by weight of the total formulation,
- wherein the first petroleum hydrocarbon is a paraffin having a viscosity at 100 °C greater than 6 centistokes and is in the range of from about 13% to about 23% by weight of total formulation, and
- wherein the second petroleum hydrocarbon is a paraffin having a viscosity at 100°C greater than 6 centistokes and is in the range of from about 21% to about 31% by weight of total formulation.
12. The protective lubricant formulation as recited in Claim 11, further wherein the formulation is placed under pressure for aerosol application.
13. The protective lubricant formulation as recited in Claim 11, further wherein said first and second petroleum hydrocarbons contain straight chain and branched hydrocarbons.
14. The protective lubricant formulation as recited in Claim 11, further wherein said first petroleum hydrocarbon has a congealing point below 70°C.
15. The protective lubricant formulation as recited in Claim 14, further wherein said second petroleum hydrocarbon has congealing point below 55°C.
16. The protective lubricant formulation as recited in Claim 11, further wherein said first petroleum lubricant has a congealing point in the range of 55-70°C.
17. The protective lubricant formulation as recited in Claim 11, further wherein said second petroleum lubricant has a congealing point in the range of 45-55°C.

## ABSTRACT OF THE DISCLOSURE

A surface protective lubricant formulation that can be applied to a variety of surfaces and provides enhanced anti-corrosion capabilities, the formulation consisting of one hundred percent (100%) hydrocarbon components. In particular, the composition includes a solvent hydrocarbon, and first and second petroleum hydrocarbons. The hydrocarbon solvent, which is mineral spirits, is in the range of from about 20% to about 70% by weight of the total formulation, with about 55% being optimal. The solvent hydrocarbon used herein is preferably the chemical named synthetic iapparaffinic hydrocarbon. The first petroleum hydrocarbon is in the range of from about 1% to about 35% by weight of the total formulation, with about 18% being optimal. The first petroleum hydrocarbon is manufactured by ExxonMobil Corporation under the trade name PROWAX 561. The second petroleum hydrocarbon is in the range of from about 1% to about 40% by weight of the total formulation, with about 26% being optimal. The second petroleum hydrocarbon is manufactured by ExxonMobil Corporation under the trade name PROWAX 890.